

CLAIMS

1. A process for depositing undoped transparent oxide semiconductors,  
5 selected from the group consisting of zinc oxide, indium oxide, tin oxide,  
and cadmium oxide, in a field effect transistor, comprising a method  
selected from the group consisting of :
- a) physical vapor deposition of undoped TOS in an effective partial  
pressure of oxygen mixed with an inert gas;
  - 10 b) resistive evaporation of undoped TOS in an effective partial  
pressure of oxygen;
  - c) laser evaporation of undoped TOS in an effective partial  
pressure of oxygen;
  - d) electron beam evaporation of undoped T-OS in an effective  
15 partial pressure of oxygen; and
  - e) chemical vapor deposition of undoped T-OS in an effective  
partial pressure of oxygen.
2. The process of Claim 1 where the physical vapor deposition is rf  
20 magnetron sputtering.
3. The process of Claim 1 where the physical vapor deposition is dc  
magnetron sputtering.
- 25 4. The process of Claim 1 where the physical vapor deposition is diode  
sputtering.
5. The process of Claim 1 where the physical vapor deposition is triode  
sputtering.
- 30 6. The process of Claim 1 where the physical vapor deposition is ion  
beam sputtering.

7. The process of any of claims 1(a), 2, 3, 4, 5 or 6 wherein deposition is by physical vapor deposition and wherein the inert gas is selected from the group consisting of helium, neon, argon, krypton, and xenon.
8. The process of Claim 1(e) wherein the chemical vapor deposition is low pressure chemical vapor deposition.
9. The process of Claim 1(e) wherein the chemical vapor deposition is plasma-enhanced chemical vapor deposition.
10. The process of Claim 1(e) wherein the chemical vapor deposition is laser-enhanced chemical vapor deposition.
11. The process of Claim 1(e) where the chemical vapor deposition is atomic layer chemical vapor deposition.
12. The process of any one of claims 1 to 11 wherein the effective partial pressure of oxygen is between 0.1 and 10 times the critical pressure.
13. The process of any one of claims 1 to 11 wherein the effective partial pressure of oxygen is between 0.5 and 2 times the critical pressure.
14. A transistor comprising an undoped transparent oxide semiconductor.
15. A transistor comprising a transparent oxide semiconductor made by a process selected from the group of process consisting of the process as of Claim 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 and 13.
16. A flat panel display comprising one or an array of transparent oxide semiconductor transistors as described by Claim 14.

17. An active matrix imager comprising an array of transparent oxide semiconductor transistors as described by Claim 14.
18. A sensor comprising an array of transparent oxide semiconductor  
5 transistors as described by Claim 14.
19. A rf price label comprising an array of transparent oxide semiconductor transistors as described by Claim 14.
- 10 20. A rf identification tag comprising an array of transparent oxide semiconductor transistors as described by Claim 14.
21. A rf inventory tag comprising an array of transparent oxide semiconductor transistors as described by Claim 14.  
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22. The transistor of Claim 14 deposited on a flexible substrate.
23. The transistor of Claim 14 or Claim 15 further comprising source,  
drain and gate electrodes fabricated from a material selected from the  
20 group consisting of zinc oxide, indium oxide, tin oxide, and cadmium oxide.
24. The transistor of Claim 22 further comprising a gate dielectric  
fabricated from a material selected from the group consisting of zinc oxide,  
25 indium oxide, tin oxide, and cadmium oxide.